

Intensive Treatment Program for Students with Game Addiction based on Multiple Intelligences

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ABSTRACT

For this paper, we developed a game-addiction therapy program for students with gaming addiction based on multiple intelligences (MI) and verified its effects. The participants were 54 elementary students selected through a game addiction test in Incheon City, Korea. We tested the students' MI to facilitate program development. The students with gaming addiction showed strengths in the Bodily-kinesthetic, Naturalist, and Spatial intelligences whilst showing weaknesses in the Logical-mathematical, Intrapersonal, and Interpersonal intelligences as opposed to normal students who had opposite results. We arranged the program around various gaming and playing activities to engage their stronger intelligences; we added activities to address their weakness (i.e., Logical-mathematical, Intrapersonal, and Interpersonal intelligences). This study has shown that this program lowered the game immersion level of the students and was helpful in turning their attention to other activities. There were significant differences between pretest and posttest game addiction scores ($p < 0.001$). Their weekly gaming time and computer usage decreased rapidly. Satisfaction with the game addiction therapy program based on MI was very high.

Keywords : Gaming Addiction, Game-addiction Therapy Program, Multiple Intelligences

다중지능이론 기반의 게임중독치료 프로그램

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요약

본 논문에서는 게임중독 학생들을 위한 가드너의 다중지능 이론을 기반으로 한 게임중독치료 프로그램을 개발하고 그 효과를 검증하였다. 게임중독척도에 의해 선발한 I 교육청 초등학교 54명을 대상으로 하였으며, 프로

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그럼 개발 전 무작위로 선발된 비교 학생들과 게임중독학생들의 다중지능을 검사하였다. 다중지능 검사결과, 게임중독 학생들은 일반 학생들에 비해 신체지능, 자연친화지능, 공간지능에서 강점을 가진 것으로 나타났다. 반면, 논리수학지능, 대인관계지능, 자기성찰지능에서는 일반학생에 비해 약점으로 나타났다. 이에 본 연구는 게임중독 학생들의 강점을 고려하여 학생들의 흥미를 높이기 위해 다양한 게임과 학습놀이 위주로 프로그램을 구성하였으며, 그들의 약점을 보완하기 위한 활동들을 추가하였다. 개발된 프로그램은 5일간 30시간에 걸쳐 진행하여 효과성을 검증한 결과, 학생들의 게임 중독 수준(G척도)이 통계적으로 유의미하게 낮아졌으며($p < 0.001$) 다른 활동으로의 시선돌리기에 도움을 주었음을 보였다. 또한, 일주일간 게임시간과 컴퓨터 사용시간이 줄었으며 프로그램에 대한 만족도도 매우 높았다.

키워드 : 게임중독, 게임 중독 치료 프로그램, 다중지능

1. Introduction

Computer game addiction is the excessive use of computers and internet games that may interfere with daily life. Students can access computer games easily because of the general availability of computers and the internet, which makes over-indulgence in computer games increase in correspondence with various social and home problems [19]. Therefore, game addiction has emerged lately as a major social problem.

Game addiction among elementary and secondary students is very dangerous to them, in that younger students tend to be more addicted to computer games. However, young age is also associated with ease of freeing oneself from game addiction. Therefore, prevention and treatment programs from various perspectives are needed for elementary students [19][15]. With this in mind, researchers have examined the propensity for students with game addiction to appear differently from general students [12][24].

In addition, a variety programs intended to prevent and treat game addiction in students have been developed and applied. Such programs have employed several types of approaches: cognitive behavioral [17][5], counseling [12][10], athletic [4], and informative/educational [3][10]. Research examining game addiction and educational programs to prevent

game addiction has been conducted; nevertheless, there is a lack of specific treatment methods and educational programs to treat game addiction [20].

The self-esteem, aggression, and impulsiveness of students with game addiction are relatively lower than those of general students [4][5]. Short programs have been developed that are suitable to the unique propensities of students with computer game addiction. Therefore, in this study, specific research to understand how the characteristics of students with computer game addiction are different from those of average students will be conducted, and a program adapted to those with game addiction will be developed.

Gardner's theory of multiple intelligences (MI) [7] has been applied to various education fields. MI have been categorized into eight types. Researchers have tried to apply these MI to diverse subject learning [21][13][23][6]. As a result, MI-based approaches increase students' interest and learning effects. Positive effects of MI-based programs on the affective domain, such as students' creativity and self-esteem, have also been identified [1]. Therefore, these MI-based programs have resulted positive effects through application to appropriate classes [22][2]. On the other hand, students' insufficient intelligences can be developed through study of lessons relating to particular intelligences [18].

In this study, we developed a treatment program for students with game addiction that considers the MI characteristics of students. Therefore, we conducted MI tests to comprehend the characteristics of students with game addiction and showed that their test results were different from those of average students. This result had been the foundation of the improved interest of students with game addiction and the development of a treatment program intended to mitigate immersion syndrome. We thought it could be effective to raise interest levels and divert attention from game playing among students with game addiction by applying knowledge of their strengths to a treatment program for prevention of game addiction. Moreover, we intended to mitigate immersion syndrome by making up for the students' insufficient intelligence.

2. Background

2.1 Game Addiction Therapy

It is important to understand the detailed characteristics of students in order to apply the appropriate program. There is some existing research describing students with gaming addiction and how to provide treatment for them [19][15].

Researchers have shown that educational efforts are required to prevent game addiction or cure students with game addiction. According to this social stream, some researchers investigated the characteristics of students with gaming addiction in terms of their self-recognition, tendencies, behavior in society, violence, and aggression [12][24]. The results showed that students with gaming addiction have different characteristics than average students have.

Therefore, various approaches to curing students with gaming addiction are necessary, and several therapy programs for them have been developed and applied [4][5][9][17][8]. In addition, some pro-

grams based on psychological methods have been developed [11].

In addition, some researchers have tried new approaches to game addiction therapy: Beak (2009) used game programming to relieve symptoms of game addiction, finding that game programming provided effective relief for students with gaming addiction. Seo (2011) showed that Scratch programming is useful to inform students with gaming addiction that alternative amusements can be as enjoyable as games.

In spite of that prior research, no game addiction therapy study has considered students' characteristics. Therefore, we developed and verified a new approach for game addiction therapy by considering students' characteristics.

2.2 Multiple-Intelligence - Based Education

The MI theory was developed by Gardner (1989), who viewed intelligence as the capacity to solve problems or fashion products that are valued in one or more cultural settings. He reviewed the literature using eight criteria or signs of intelligence and gave the following suggestions: Linguistic intelligence, Logical-mathematical intelligence, Musical intelligence, Bodily-kinesthetic intelligence, Spatial intelligence, Interpersonal intelligence, Naturalist intelligence, Intrapersonal intelligence.

These days, MI has spread to various educational fields. Several research studies have investigated the effectiveness of MI in curriculum subjects [22][13][23][6]. These results showed when MI is employed in educational fields, the effectiveness of learning and learners' interest are increased.

Moreover, in many other cases, MI effectively facilitates extracurricular activities via creativity or self-esteem [1][14]. Thus, these results showed that MI theory could be effectively employed to facilitate both formal education and personal development.

Additionally, some researchers who studied teaching and learning based on Stanciu (2011) investigated an intervention program based on MI teaching techniques; it led to significant improvement of academic results in students with learning difficulties and a more favorable view of learning situations within the context of more differentiated learning. Al Sulim (2012) verified that MI teaching strategies are perfectly consistent with the different types of MI; accordingly, we consider that adaptation of teaching strategies to consider students' relatively strong MI is effective.

On the other hand, in some studies, MI have been developed through facilitation of learning activities; Li (2012) revealed the learning strategy of developing Logical-mathematical intelligence through mathematics education.

Hence, we assumed that teaching strategies considering students' strong MI types were effective for game addiction therapy; these might increase students' interest in alternative activities without the use of computer games. We developed a teaching strategy for students with gaming addiction based on MI and verified its effectiveness.

3. Experiments

3.1 Design of the MI-Based Game Addiction Therapy

This study applied MI theory to the development of a game addiction therapy program. The program was designed to enhance the low intelligences of students with game addiction, mostly by using their high intelligences. Especially, Intrapersonal and Interpersonal intelligences have strong influences on their game addiction. Therefore, we designed the

program to improve those intelligences. We named the program "Information Culture Camp," considering that it was designed for students with game addiction. The processes of the study are as follows.

First, we selected the top 54 elementary students according to the results of the Internet Game Addiction Scale (G-scale test; Korea Agency for Digital Opportunity and Promotion, 2006) for Internet Game Addiction Tendency in Incheon City, which is a large city in Korea. The G-scale test was developed by the Korean Agency for Digital Opportunity and Promotion (KADO) (2006) to test students' game addiction levels [16].

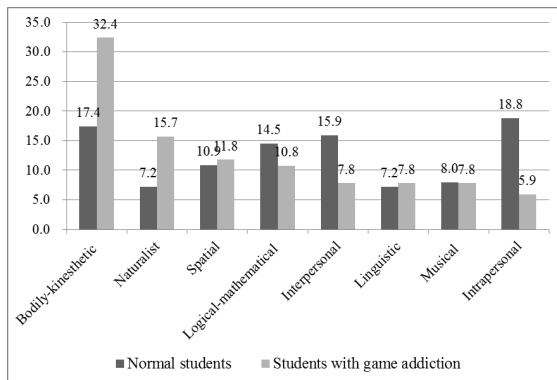
Next, we tested the 54 students' MI to help in designing the game addiction therapy program. At the same time, we also tested the MI of randomly selected students. Then, we designed the game-addiction therapy program to suit the MI characteristics of the students with gaming addiction. Moreover, the program's validity was verified by the Delphi method among experts.

Then, we carried out the game-addiction therapy program 8 hours daily for 5 days at the Gyeongin National University of Education. All students wrote dairies documenting their daily computer use, and mentors and teachers observed and counseled them throughout. The mentors were 11 Gyeongin National University of Education university students, each assigned 4-6 elementary students.

After the program, we tested the students using the G-scale again and compared the results with their pre-study G-scale scores. Moreover, we surveyed the students' impressions of and satisfaction with the camp on the last day.

3.2 Multiple Intelligences of Students with Gaming Addiction and Normal Students

We tested the MI of the normal students and students with gaming addiction to develop a game addiction therapy program based on MI. The results of the tests were as follows.



(Fig. 1) MI of students with gaming addiction(n=54) and normal students(n=69)

The results of the MI test showed that students with gaming addiction had a different MI distribution to normal students. Then, we counted the first two intelligences of the students by groups. After that, we converted their intelligence to a percentage pertaining to whole intelligence numbers. The results highlighted that the students with gaming addiction showed strengths in the Bodily-kinesthetic, Naturalist, and Spatial intelligences whilst showing weaknesses in the Logical-mathematical, Intrapersonal, and Interpersonal intelligences as opposed to normal students who had opposite results.

We organized the program to improve the students' self-management ability and sociability to promote the use of their strong MI. These methods were expected to help them to alleviate their game addiction (Stanciu, 2011; Al Sulim, 2011; Li, 2012). Therefore, in this study, we designed an MI-based game addiction therapy program to enhance the

participants' low intelligences, such as Intrapersonal and Interpersonal ones, by using the Bodily-kinesthetic, Naturalist, Spatial, and Logical-mathematical intelligences, for which the students with gaming addiction tested higher.

3.3 Constructing Activities for Game Addiction Therapy

The activities and contents of the MI-based game addiction therapy were as in Table 1. The program's validity was verified by the Delphi method, which was conducted by eight teachers who were completing teacher training or who had experience-teaching students with gaming addiction. We asked them the validity of each program on a scale ranging 1 - 5. The resulting validity levels were all high (Table 1).

The game addiction therapy program was comprised by 10 activities as table 1. The times of the activities comprising the MI-based game addiction program were arranged considering the strength of the Logical-mathematical and Bodily-kinesthetic intelligences in students with gaming addiction. First, learning Scratch (EPL) engages the Logical-mathematical, Bodily-kinesthetic, Spatial, and Linguistic intelligences (Kim, 2011). Moreover, programming therapy using Scratch was based on research indicating that it can improve students' MI abilities, mitigate game addiction, and have major positive effects in the affective domain (Beak, 2009).

Therefore, we arranged the EPL activities using Scratch to last 10 hours (2 hours daily). In addition, physical activity (for Bodily-kinesthetic intelligence) and Ecological experience (for Naturalist intelligence) consisted of 3 hours each. The other activities mostly consisted of varied and interesting play. Consequently, we let them have various experiences that engaged their Bodily-kinesthetic and Logical-mathematical intelligences.

<Table 1> MI-based program for students with gaming addiction

Programs	MI	Contents	Delphi
EPL activities using Scratch	Logical-mathematical, Bodily-kinesthetic, Spatial, Linguistic	Drawing figures and characters Programming for storytelling String art in programming Game programming Design and implement free projects	4.8
Physical activities	Bodily-kinesthetic, Interpersonal	The name game Tag Interaction game	5.0
Ecological experience	Naturalist, Bodily-kinesthetic, Interpersonal	Forest activities Green experience field trip Observation of animals and plants	4.3
Robotics activities	Logical-mathematical, Spatial, Interpersonal	Engineering design using a robot Mechanisms by robotic assembly Programming control	4.9
Musical activities	Musical, Interpersonal	Making an instrument Enjoying basic rhythms Kids' orchestration	4.6
Computer science play activities	Logical-mathematical, Bodily-kinesthetic, Interpersonal	Binary numeral game Finite-state automata game Routing and deadlock game	4.3
Science play activities	Logical-mathematical, Bodily-kinesthetic, Interpersonal	Air attack game Playing collaboratively	4.7
Media appreciation activities	Intrapersonal, Linguistic	Appreciation of visionary movie Writing movie reports	4.1
Friendship activities	Intrapersonal, Interpersonal	Camp orientation Leadership and self-discovery Career exploration	4.6
Mentoring activities	Intrapersonal, Linguistic	Personal counseling and observation MI testing and career counseling Writing daily log	4.7
Total and average			4.6

The following are the directions and strategies for teaching and learning the MI-based game-addiction program.

First, the program consisted of various activities to divert the students' interests towards physical activities and play (games). This was applied to physical activities, computer science play activities, science play activities, and EPL activities using Scratch.

Second, we used computer science- and science-related learning contents to improve the students' Logical-mathematical intelligence: this intelligence was facilitated by the computer science play activities, science play activities, and robotics activities.

Third, we designed some activities to improve the participants' Intrapersonal and Interpersonal intelligences: the friendship, mentoring, and media appreciation activities.

3.4 Applying the Program

We held an MI-based therapy program for students with gaming addiction for 30 total hours (6 hours daily) over 5 days of their 2012 summer vacation. The program was conducted from 9:00 a.m. to 3:00 p.m. at Gyeongin National University of Education.

The participants' characteristics were as follows (Table 2). A total of 54 students (49 boys and 5 girls) participated in the program. They were comprised by 9, 8, and 37 students in the fourth - sixth grades (aged 10, 11, and 12 years, respectively).

<Table 2> Students who participated

Grade	(ages)	Boys	Girls	Total
Fourth grade	(10 years)	8	1	9
Fifth grade	(11 years)	8	0	8
Sixth grade	(12 years)	33	4	37
Total		49	5	54

In addition, the schedule of the MI-based game-addition therapy program was as follows. On the morning of the first day, we helped the students to interact with each other and adapt to the camp through friendship activities. Then, we arranged the Scratch, robotics, and computer science activities (which engaged Logical-mathematical intelligence) in the morning, when the students' concentration tended to be high. Moreover, we arranged play-based activities (e.g., physical, musical, science play, and media appreciation activities and the ecological experience) in the afternoon to facilitate optimal improvement of the students' Bodily-kinesesthetic, Naturalist, and Interpersonal intelligences. Moreover, the mentors conducted group or personal counseling and communication with the students during break and lunchtimes.

<Table 3> Pretest and posttest with G-scale

G-scale	N	Mean	S.D.	df	t	Sig.
Pre test	54	37.22	13.093	45	2.690	0.001
Post test	54	33.48	11.796	45		

4. Results

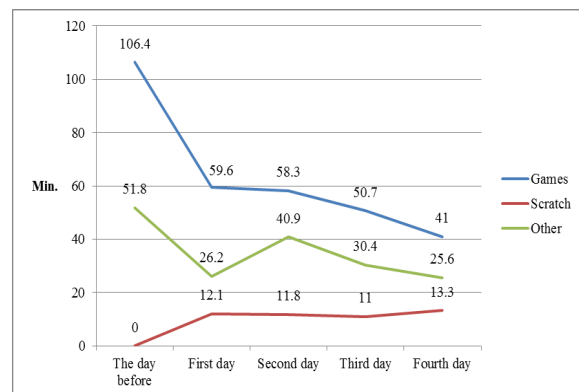
4.1 Game Addiction Self-Test Scale

The results of the pretest and posttest on the participating students' levels of game addiction are shown in Table 3.

In this paper, we used the G-scale (KADO, 2006) to test the students' game addiction levels. The G-scale was composed of 20 items, has high validity, and has been used widely in Korea.

The mean pretest and posttest scores were 37.22 and 33.48, respectively. We compared the two

means by t-test to show any actual differences. The result indicated a statistically significant difference between the students' pretest and posttest G-scale results ($p < 0.001$). Therefore, the results showed that this program effectively mitigated the students' game addiction.



(Fig. 2) Change in computer usage time

4.2 Changing computer usage time

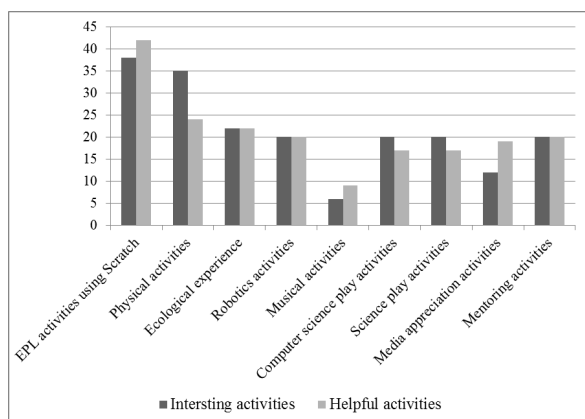
The students recorded their daily computer usage time at home throughout the program period. Computer usage time was classified into three categories: using games, Scratch programming, and other (e.g., searching for information and watching web cartoons). These results are enumerated in figure 2.

The participants' change in computer usage time was as follows. Their average game time decreased rapidly from 59.6 minutes on the 1st day to 41.0 minutes on the 4th day of the week. Other computer activities (e.g., searching for information and watching web cartoons) did not change greatly but did decrease from 26.2 minutes on the 1st day to 25.6 minutes on the 4th day. On the other hand, the results showed that the students used Scratch consistently throughout the week, from 12.1 minutes on the 1st day to 13.3 minutes on the 4th day.

4.3 Satisfaction Levels with the MI-Based Therapy Program

After the 5-day therapy program for students with gaming addiction, we surveyed the students' impressions and satisfaction levels with the camp, as follows:

1. Choose the three most interesting activities at this camp.
2. Choose the three most helpful activities at this camp.



(Fig. 3) Interesting and helpful activities

Figure 3 shows the levels of interest and helpfulness of the activities, as rated by the students in the therapy program. Especially, Scratch programs, physical activities, and robotics activities (which engaged the Bodily-kinesthetic, Logical and Spatial intelligences) were most often rated as interesting and helpful.

Moreover, these activities engage Interpersonal intelligence, which was rated as low in the students with gaming addiction, so that the therapy program would help to improve that attribute. In addition, the students with gaming addiction had high interest in the mentoring activities, although they had low Interpersonal intelligence. On the other hand, the media appreciation activities (watching a vision-

ary movie and writing a movie report) engaged Intrapersonal and Linguistic intelligence, which were low in students with gaming addiction who showed low interest. However, they felt that the media appreciation activities were useful; these results imply that these activities were very positive for them.

Finally, we asked them, "Do you want to participate in the next camp?" In total, 88.5% of them answered, "I want to participate in this camp again," which showed that their satisfaction with the MI-based game addiction therapy program was very high.

5. Conclusions

We assume that addressing their strengths and weaknesses in terms of their MI to the program would help increase their concentration and learning effectiveness while maintaining the students' interest. Therefore, we arranged the program around various games and playing to enhance the stronger intelligences of students with game addiction (i.e., Bodily-kinesthetic, Naturalist, and Spatial intelligences). Moreover, we included media appreciation, friendship, and mentoring activities to redeem their weaknesses in terms of Logical-mathematical, Intrapersonal, and Interpersonal intelligences. Thus, we have applied this program to students with game addiction for 1 week, 30 hours.

This program eased the students' game immersion level. Especially, the G-scale—which measures students' game immersion level—was lowered meaningfully through the program. Moreover, this program has revealed that computer game playing time decreased—and that of programming increased—among the students. According to the mentors' observations, the time spent using Scratch increased more than that of playing computer games among the participating students. This study has shown that this program lowered the game immersion level

of the students and was helpful in turning their attention to other activities.

The students' satisfaction with this program was very high. High student satisfaction with this program was indicated by the high percentage of students who would participate in this program again next time (88.5%). The students were interested in and satisfied with the physical play, Scratch programming activities, and robot engineering activities, as seen from the interviews with the mentors.

In conclusion, this study showed that their game addiction tendency can be improved by providing not only care systems for them but also suitable activities to their capability or intelligence, though children can reach to serious game addiction by being neglected from society or their family.

In this study, we intended to design a program according to the characteristics of students' MI. The program lowered the game addiction level of the students and received positive feedback on learning attitudes and the camp in general. For subsequent effective prevention and treatment of the students, closer observation and analysis should be performed. This study will contribute to a new approach, that is, an effective, personalized treatment program for students with game addiction.

참 고 문 헌

- [1] Abdi, A., & Rostami, M. (2012). The effect multiple intelligences-based instruction on students' creative thinking ability at 5th grade in primary school, *Cyprus International Conference on Educational Research*, 47-22, 105-108.
- [2] Al Sulim, G. H. S. (2012). Prediction of the correlation between the strategies of the teaching methods and the multiple intelligence of some graduate female students at Imam Mohammad Ibn Saud Islamic University.
- [3] Baek, S. H. (2009) The study on relief of elementary students' game addiction through the program of game development education. Master's thesis, Graduate School of Education, Gyeongin National University of Education.
- [4] Cho, Y. H., & Jang, J. C. (2010). Relation among youth's participation grade in sports, self-esteem, and propensity to Internet game addiction. *The Korea Journal of Sports Science*, 19-1, 207 - 218.
- [5] Choi, O. Y., & Son, J. L. (2011). Effects of the self-control training program on relief of online game addiction level, aggression, and impulsivity of college students with online game addiction. *The Korea Journal of Clinical Psychology*, 30-3, 723 - 745.
- [6] Coban, S., & Dubaz, İ. (2011). The relationship between active learning models in music lessons in elementary schools and multiple intelligence areas. *Procedia-Social and Behavioral Sciences*, 28, 684-690.
- [7] Gardner, H., & Hatch, T. (1989). Multiple intelligences go to school; Educational implications of the theory of multiple intelligences. *Educational Researches*, 18(8), 4 - 9.
- [8] Gweon, J. W. (2004). A qualitative case study of the effects of game-type replacement therapy in the treatment of adolescents' game addiction. *Korean Journal of Youth Studies*, 11-3, 93 - 114.
- [9] Han, D. H., Kim, S. M., Lee, Y. S., & Renshaw, P. F. (2012). The effect of family therapy on the changes in the severity of on-line game play and brain activity in adolescents with on-line game addiction. *Psychiatry Research: Neuro imaging*, 202-2, 126 - 131.
- [10] Han, S. G., & Choi, E. A. (2010), The development of game addiction treatment program using digital storytelling. *Journal of The Korean Association of Information*

- Education*, 15-2, 171 - 178.
- [11] Jang, M. K., Lee, E. K., & Jang, J. H. (2008). Group counseling manual for adolescents' game and immersion. Research report, Korea Creative Contents Agency.
- [12] Jeong, E. J., & Kim, D. H. (2011). Social activities, self-efficacy, game attitudes, and game addiction. *Cyber psychology, Behavior, and Social Networking*, 14-4.
- [13] Karamikabir, N. (2012). Gardner's multiple intelligence and mathematics education. *Journal of Social and Behavioral Sciences*, 31, 778 - 781.
- [14] Kim, S. H., Han, H. S., Han, S. G., & Kim, H. C. (2011). Multiple Intelligence-based strategy in computational literacy education, *The Journal of Korean Association of Computer Education*, 14-6, 11 - 10.
- [15] King, D. L., Delfabbro, P. H., & Griffiths, M. D. (2010). Recent innovations in video game addiction research and theory.
- [16] Korea Agency for Digital Opportunity and Promotion (2008). *The follow up study of internet addiction proneness scale* (Issue Brief No.07-13). Seoul:Author.
- [17] _____ (2006). A Study of the Development of Internet Game Addiction Scale for Children and Adolescents, Seoul.
- [18] Lee, H. C., & An, C. I., (2002). Development and effectiveness verification of cognitive behavioral therapy program for online game addiction. *Journal of the Korean Psychological Association: Health*, 7-3, 463 - 486.
- [19] Li, J., Ma, S., & Ma, L. (2012). The Study on the Effect of Educational Games for the Development of Students' Logic-Mathematics of Multiple Intelligence. *Physics Procedia*, 33, 1749-1752.
- [20] Oh, W. O. (2005). Computer game usage and needs for education on the prevention of computer game addiction among elementary school children. *Journal of Korean Society for Health Education and Promotion*, 22-4, 1 - 16.
- [21] Seo, J. B., Kim, S. H., & Han, S. G. (2010). The development of the game addiction remedy program based on scratch programming. *The Journal of Korean Association of Computer Education*, 14-1, 61-69.
- [22] Stăncună, L.-A., & Crăciun, A.-I. (2011). A multiple intelligences approach: Intuitive English learning - A case study for k-1 students. *Journal of Social and Behavioral Sciences*, 11, 72 - 76.
- [23] Stanciua, D., Orban, I., & Bocos, M. (2011). Applying the Multiple Intelligences Theory into pedagogical practice. Lessons from the Romanian primary education system.
- [24] Sulaiman, T. (2010). Teaching strategies based on multiple intelligences theory among science and mathematics secondary school teachers. *Journal of Social and Behavioral Sciences*, 8, 512 - 518.
- [25] Weinstein, A. M. (2010). Computer and video game addiction—A comparison between game users and non-game users. *The American Journal of Drug and Alcohol Abuse*, 36, 268 - 276.

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